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ABSTRACT

A study investigated the effect that task instruction sheets had on the performance of vocational horticulture students when being taught a unit on poinsettia production. Using a post-test only control group design, researchers administered a 35-item multiple choice test on poinsettia production to 207 students in 12 randomly selected eleventh grade vocational horticulture classes. Of the 207 students participating in the study, 90 were in the control group and 117 were in the experimental group. Before being asked to complete the test, classes in the experimental group received a series of task instruction sheets on poinsettia production along with a monograph describing the nature and use of task instruction sheets. Classes in the control group received neither the task sheets nor the monograph. It was concluded that task instruction sheets are capable of causing significant increases in student achievement and that, as such, they should be given consideration as an important element of effective laboratory management. Based on these findings, recommendations were made calling for the integration of task instruction sheets into normal units of study included in vocational agricultural courses with extended laboratory periods and for the development of packages of such task instruction sheets in specialized vocational agricultural taxonomy areas. (MN)

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SUMMARY OF RESEARCH

DEPARTMENT OF AGRICULTURAL EDUCATION

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THE EFFECTS OF TASK INSTRUCTION SHEETS ON THE PERFORMANCE OF VOCATIONAL HORTICULTURE STUDENTS

ED230713

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U.S. DEPARTMENT OF EDUCATION
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INTRODUCTION

In recent years, managing a vocational laboratory has become an increasingly difficult and complex task facing many agricultural educators. Specialized instruction areas, diverse groups of students and extended laboratory time have caused agricultural educators to seek alternative ways of providing practical "hands on" instruction when traditional out-of-school supervised occupational experience programs were not possible. One alternative to extensive out-of-school occupational experience programs has been the well-equipped modern laboratory found in many of today's area vocational schools. The laboratory, while falling short of a real world occupational experience program, has provided the learner with many of the practical experiences formally obtained through more traditional supervised occupational experience programs. However, as laboratory time was extended and increased value and emphasis was placed on the laboratory

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experience, the problems of generating meaningful educational experiences in the laboratory increased. Developmental problems with curriculum and curriculum materials coupled with instructional problems in developing supervision and evaluation techniques for the laboratory continued to grow. It became apparent that some form of structure in the form of curriculum material might prove to be helpful.

PURPOSE

The major purpose of this study was to investigate the effect that task instruction sheets (Appendix A) had on a student's level of mastery when being taught a unit on poinsettia production.

MAJOR HYPOTHESES

The major hypotheses investigated in this study were:

1. Students taught a unit on poinsettias using a series of task instructional sheets will score significantly higher on the criterion referenced posttest than students taught a unit on poinsettias without the use of task instructional sheets.

2. There will be a positive relationship between a student's score on a criterion referenced posttest and a student's reading aptitude as measured by a score on a standardized reading test.

3. There will be significant interaction between the type of instructional treatment received and a student's reading level (high, medium, low) as reflected by significantly higher posttest scores at higher reading levels for the experimental group.

METHODOLOGY

To test the major hypotheses, a posttest only control group design was selected. As described by Campbell and Stanley (1963), this is a true experimental design.

The experimental units for the study were eleventh grade classes of vocational horticulture students. The twelve classes were randomly assigned to either the experimental or control level of the treatment. Each level of the treatment consisted of six intact classes with a total enrollment of 207 students. Of the 207 students participating in the study, ninety (43.5 percent) were in the control group, and 117 (56.5 percent) were in the experimental group. The average class size for the experimental group was 18, while the average class size for the control group was 15. No teacher participating in the study had less than two years teaching experience.

Those classes in the experimental group received a series of task instruction sheets on poinsettia production along with a monograph describing the nature and use of task instruction sheets. Those classes in the control group received neither the task sheets nor the monograph describing their use. Rather, teachers in this group were asked to teach the unit on poinsettia production as they had done in previous years. Both groups received the same end of unit posttest. In addition to the manipulated independent variable method of instruction, one attribute variable, reading ability, was measured.

Data and Instrumentation

A thirty-five item multiple choice poinsettia production posttest was developed to qualify the dependent variable, student achievement. The posttest was comprised of items designed to cover the major points emphasized in teaching a unit on poinsettia production. Content validity for the posttest was established by a review panel of selected horticulture teachers in the State of Ohio. During September of 1978, the posttest instrument was pilot tested with students enrolled in three horticulture departments in Franklin County. After completion of the pilot testing, the data were processed to locate non-discriminating test items and to establish the reliability of the test. A reliability estimate of .78 was calculated using the Kuder-Richardson 20 formula.

The attribute variable, reading ability, was measured by administering a standardized form of the Gates-MacGinitee Reading Test. All students participating in the study were tested using Level F, Form 1, of the standardized test.

A forty-two item questionnaire was developed to monitor the teaching techniques used by teachers providing instruction on poinsettia production. The questionnaire was divided into two parts: Part A and Part B. Part A was completed by every teacher participating in the study and was designed to collect information on general instructional techniques used by teachers when teaching a unit on poinsettia production. Part B was completed only by those teachers in the experimental group and was designed to collect specific information on how experimental teachers used the poinsettia task instruction sheets during the course of their instruction on poinsettia production. The questionnaires were administered to teachers after completion of the poinsettia unit.

Data Analysis

Hypothesis one, postulating significant difference between the mean posttest scores of the experimental and control groups was tested by using analysis of covariance. To control for the variation in reading abilities of the students and to evaluate the true effects of the treatment, mean classroom reading scores were used as the covariate. The unit of analysis was schools. The dependent variable was mean classroom reading scores.

Hypothesis two was analyzed by calculating a Pearson product moment correlation coefficient to determine the relationship between mean classroom posttest scores and mean classroom reading scores.

Hypothesis three examined the interaction between treatment and reading scores on posttest scores. The unit of analysis was individual reading and posttest scores. The data were analyzed by dividing student reading scores into three levels and then subjecting the data to a 3 X 2 factorial analysis of variance test. Reading scores and treatment were used as the independent variables. The dependent variable was individual posttest scores of both the experimental and control groups.

FINDINGS

The results of the analysis of covariance for testing hypothesis one revealed a significant difference, $F(1,11) = 5.16$, $p < .05$, in the students' posttest scores at both levels of the treatment, method of instruction. Table 1 provides F values for the main effects of treatment, method of instruction and for the effects of the covariate, reading scores. When the effects of the covariate, reading ability, were held constant, the series of task instruction sheets, Poinsettia Production, made a significant difference in student achievement, as measured by the students' posttest scores.

Table 1

Analysis of Covariance: Adjusted Mean Posttest Scores by Treatment

Source	df	SS	MS	F
Reading Scores	1	32.84	32.84	4.05[b]
Treatment	1	41.84	41.84	5.16[a]
Residual	9	72.90	8.10	
TOTAL	11	147.58	13.41	

[a] $p < .05$

[b] $p > .05$

The results of the Pearson product-moment correlation coefficient used to test hypothesis two revealed a moderately positive relationship between mean reading scores and mean posttest scores. A correlation coefficient of .47 with an n of 12 suggests a moderately positive relationship between posttest scores and reading scores but was not sufficient to reject the null hypothesis at an alpha level of .05. Thus, the data did not support the research hypothesis, and the omnibus null was retained.

Hypothesis three postulated interactive effects between treatment and reading scores. To examine the interactive effects, the data for hypothesis three were analyzed by arranging the mean classroom reading scores from high to low and then dividing these mean scores into three levels: high, medium and low. The data were than analyzed using 3 X 2 analysis of variance with reading levels and treatment used as the independent variables. The results of the analysis of variance were invalid since two of the six cells involved in the 3 X 2 factorial analysis resulted in only one observation per cell. The small n produced by the true experimental design of this study made any attempt to look at interaction impossible. Therefore, to test for interaction with cell observations of sufficient magnitude, individual student reading scores were used as the unit of analysis.

The data were than subjected to a two-way analysis of variance, with reading level and treatment level being used as the independent variables.

Table 2 provides F values for the main effects of treatment and reading level as well as an F value for the two-way interaction between treatment and reading level.

The calculated F values of 19.08 for treatment and 17.15 for reading level proved to be significant, $p < .01$. The calculated F value of 1.19 did not surpass the critical value needed to reject the null hypothesis. Therefore, the research hypothesis postulating significant interaction between reading and posttest scores was not supported by the data.

Table 2

Analysis of Variance: Posttest Scores by Treatment by Reading Level

Source	df	SS	MS	F	P
Treatment	1	459.00	459.00	19.08[a]	.000
Reading Level	2	825.04	412.52	17.15[a]	.000
Treatment x Reading Level	2	57.38	28.69	1.19[b]	.305
Residual	201	4833.48	24.04		
TOTAL	206	6020.09	29.22		

[a] $p < .01$

[b] $p > .05$

CONCLUSIONS

It was concluded that task instruction sheets are capable of causing significant increases in student achievement and as such should be given consideration as an important component of effective laboratory management. Furthermore, no significant relationship exists between students' ability to read and their performance on a written test. It was also concluded that there was no significant interaction between a student's ability to read and the treatment.

DISCUSSION

The experimental group of teachers reported that task instruction sheets help contribute to greater student achievement by organizing and structuring both the laboratory and classroom portions of the poinsettia unit. Generally, teachers felt that task instruction sheets helped to make the job of teaching easier, created minimal additional work and provided accurate information for growing a crop of poinsettias.

Reading levels for both the experimental and control group were determined by administering a standard version of the Gates-MacGinitee Reading Test. A t test on the mean reading scores of each group determined that the groups were statistically equivalent. However, the data did not support the hypothesized relationship between reading ability and posttest scores. The analysis produced a correlation coefficient of .47 which was not statistically significant at an alpha level of .05. It is the opinion of the investigators that the lack of statistical significance was a direct function of sample size. The true experimental design of this study dictated that the analysis be performed with a sample of twelve. The conclusion to be drawn is that future studies which examine relationships between attribute and dependent variables would yield more valid and statistically significant results if the size of the sample were increased considerably.

The data reported for hypothesis three did not support the contention of significant interaction between treatment and reading scores on posttest scores. However, while the data did not support the contention of significant interaction, it did reveal that the greatest amount of student achievement occurred for those students using task instruction sheets. Examination of the control and experimental mean posttest scores at each of the three reading levels showed higher mean posttest scores for the experimental group at every reading level. The conclusion to be drawn from studying the data is that students who used task instruction sheets, regardless of their reading ability, performed better on the written end of unit posttest. Those students with the greatest amount of reading ability profited most from the task instruction sheets, while those with the least amount of reading ability profited least.

RECOMMENDATIONS

Based on the findings of the study and the experience of the investigators in conducting the study, the following recommendations are given:

1. It is recommended that teachers engaged in teaching vocational agriculture courses with extended laboratory periods give serious consideration to integrating task instruction sheets into their normal units of study. The results of this study have demonstrated that when task instruction sheets are used in conjunction with normal lesson planning, the increase in student achievement is significant.

2. It is recommended that Curriculum Materials Services join efforts with teachers, supervisors and teacher educators in specialized taxonomy areas to develop "packages" of task instruction sheets which deal comprehensively with major blocks of instruction in specialized taxonomy areas.

A two-pronged approach aimed at identifying skills essential to successful performance in specialized job areas coupled with in-service programs on the nature of task instruction sheets would contribute greatly to the use of task instruction sheets throughout the states.

Additionally, the following recommendations for further study are offered:

1. It is recommended that subsequent studies to determine the effectiveness of curriculum materials be designed to simultaneously evaluate the confounding effects of aptitude variables, such as reading ability, on criterion variables such as student performance. Future studies which attempt to separate the effects of the aptitude variable from the treatment variable must employ a design which will permit the researcher to better qualify and control the variables of interest.

   A two-factor design in which the subjects were blocked on the aptitude variable of interest would permit the researcher to evaluate the effects of the treatment at various levels of the aptitude variable of interest. A design of this type would yield two major benefits:

   a. It would increase the power of analysis by permitting the researcher to use students as the unit of analysis, thereby increasing the size of the sample subjected to statistical analysis.

   b. It would permit the researcher to closely examine the interactive effects between aptitude and treatment variables.

2. It is recommended that a future study be developed to examine the question of what variables are highly correlated with increased student achievement.

Characteristics such as student and teacher backgrounds, as well as the attitudes of the student and teacher towards the curriculum materials provided should be monitored and correlated with student achievement.

3. It is recommended that a future study be developed to determine the effects of providing instruction on how to use task instruction sheets prior to their use in the classroom. The question for investigation would be: Are task instruction sheets more effective if teachers are adequately taught how to use them prior to their use in the classroom?

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SUMMARY OF RESEARCH SERIES

Task instruction sheets provide a structure for student acquisition of skills in a laboratory setting. This author hypothesized that the use of these instruction sheets would result in greater student achievement. The extent to which the effectiveness of task instruction sheets interact with the reading level of students was also examined. This study should be of interest to curriculum materials developers, researchers, teachers, teacher educators and others interested in improving the learning of skills in school laboratories.

This summary is based on a Doctor of Philosophy dissertation by Dennis C. Scanlon under the direction of L. H. Newcomb. Dr. Scanlon is an assistant professor, Department of Agricultural and Extension Education, The Pennsylvania State University. Dr. Newcomb is a professor, Department of Agricultural Education, The Ohio State University. Special appreciation is due Alan A. Kahler, Professor, Agricultural Education Department, Iowa State University; Gary E. Briers, Associate Professor, Department of Agricultural Education, Texas A&M University; and Antoinette Wojciak Welch, Vocation Education Consultant, Ohio Agricultural Education, Curriculum Materials Service, The Ohio State University for their critical review of this manuscript prior to its publication.

Research has been an important function of the Department of Agricultural Education since it was established in 1917. Research conducted by the Department has generally been in the form of graduate theses, staff studies and funded research. The purpose of this series is to make useful knowledge from such research available to practitioners in the profession. Individuals desiring additional information on this topic should examine the references cited.

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